

PATENT SPECIFICATION



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COMPLETE SPECIFICATION

Improvements in or relating to Photographic Film Apparatus such as a Camera or Optical Projection Apparatus

We, KODAK LIMITED, a Company registered under the Laws of Great Britain, of Kodak House, Kingsway, London, W.C.2 (Assignees of JOSEPH MIHALYI, citizen of the United States of America, of 333 State Street, Rochester, New York, United States of America) do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a photographic film apparatus, such as a roll film photographic camera or a film projector.

A roll film camera has heretofore been proposed in which a member operatively engaging a film take-up spool is rotatable by a winding key to withdraw film from a film supply spool onto the take-up spool, a spring connected with a member engaging in the supply spool being tensioned during such un-winding of the film and being permitted after exposure of a film area to rotate the supply spool in a direction to rewind the film thereon.

In contradistinction thereto, a photographic film apparatus according to the present invention is provided with a member for operatively engaging a film supply spool and rotatable by a manual winding member or key connected to a spring motor which is tensioned during winding of the key to withdraw the film from the supply spool into a film receiving chamber in which without the use of a take-up spool the film is constrained to coil up upon itself, the spring motor being permitted after each exposure of a film area to rotate the supply spool in a direction to rewind the film thereon.

In carrying the invention into effect according to this preferred form, the spring motor, while being tensioned, is engaged by a latch member which is released automatically to render the spring motor operative to move the film back towards the supply spool when a member connected with the latch member is disengaged from one of a series of notches provided in an edge of the film.

Referring now to the accompanying drawings:—

Fig. 1 is a plan view, partially in section, of a camera embodying the preferred form of the present invention; 55

Fig. 2 is a longitudinal section on the line II—II of Fig. 1;

Fig. 3 is a sectional plan view on the line III—III of Fig. 2; 60

Fig. 4 is an end sectional elevation on the line IV—IV of Fig. 2; and

Fig. 5 is a perspective view of the essential parts of a film projector employing automatic film advancing mechanism according to the present invention. 65

Figs. 1—4 illustrate a camera comprising a camera body 1 having an objective mount 2 on the front wall 3 of the camera. The top wall 4 of the camera carries a trigger member 5 for operating a shutter, and a dial 6 which may be pre-set to determine the speed of an exposure effected by shutter blades 7 and 8. 70

A supply spool chamber 12 provided within the camera body is closed by a screw threaded cover 13 carried by the top wall 4 of the camera. This cover carries a spool centering pin 15 in axial alignment with a post 18 rotatably supported in a wall 16 spaced from the bottom wall 17 of the camera. The post 18 carries a pin 19 which engages a slot 20 provided in the end of a hub 21 of a film spool S. This film spool is provided with flanges 21, the peripheries 22 of which are spaced apart a distance less than the width of the film F and normally hold the film against unwinding. When the film is unwound it is curved transversely by a concave roller 24 and passes freely from the spool chamber 12 across an exposure aperture 25 and through a guideway formed by camera walls 26 and a fixed plate 27. The film F is directed through an opening 28 into a semi-cylindrical take-up spool chamber 29 provided with a leaf spring 30 to assist the coiling of the film upon itself in the chamber 29. 75 80 85 90 95

A spring motor including gears 31, 32 33 and 34 is provided between the walls 16, 17 to drive the film spool S at the desired speed. A winding handle 37 is provided on a shaft 36 which supports the gear 34. After a film has been inserted into the chamber 12, the film is unwound 100 105

into the take-up chamber 29 by turning the handle, the gear 34 being rotated in the direction shown in Fig. 3 and the film spool S being rotated in a counter-clockwise direction as viewed in Fig. 1. A latch element in the form of a pawl 37 engaging gear 34 prevents operation of the motor while the film is being unwound; consequently, the spring 35 is tensioned as the film is unwound.

The film F is provided with a series of edge notches 38, one for each exposure area, which are engaged by a spring-pressed feeler arm 39 secured to a cross rod 41. A spring controlled lug 42 is provided on the second shutter blade 8 and operates the arm 39 as the blade returns to its initial position of rest after making an exposure, i.e., when the trigger 5 is depressed to make an exposure, and the second shutter blade 8 swings clockwise about its pivot, the lug 42 will swing about its pivot 42a against the pressure of spring 42b without operating the end 43 of the feeler arm 39. When the blade returns after an exposure, the lug is prevented from yielding by means of pin 42c and will therefore operate end 43 to lift the arm 39 from the notch 38. The spring motor 35 is thus released immediately to wind the film back onto the spool S, since the pawl 37, which is also carried by the rod 41, is disengaged from the teeth of gear 34. The feeler arm 39 rides on the edge 40 of the film until it engages the next notch 38. Simultaneously with such engagement the pawl 37 re-engages the gear 34 to stop the spring motor. Further movement of the film is thus prevented until the shutter is again actuated. The above sequence of release operations is repeated until all of the film has been exposed and returned onto the film spool S which may then be removed.

While the present invention is particularly suitable for use in cameras, it is also equally useful for other forms of photographic film apparatus, such as 'still' projectors or printers. Fig. 5 illustrates the application of the invention to a 'still' projector.

In Fig. 5 the film spool S' is provided with a film F' which is first manually unwound into a chamber 50 in which it coils upon itself. Upon actuation of a cable release C or other suitable means, the film is moved automatically into projecting position in front of a film gate 51 during return of the film on to the original spool S'.

As in the first embodiment of my invention, we provide a spring motor consisting of a spring member 52 and gears 53, 54 and 55. The last gear is preferably connected to a speed control governor 56.

When the handle 57 is turned to unwind the film from the spool S' through the film gate past the exposure frame 51, the spring motor is tensioned and the spring motor is held in a tensioned condition by means of a latch element in the form of a tooth 58 engaging gear 54. The tooth 58 is carried by a bell-crank lever 59 pivoted at 60 and having a pin 61 riding on the edge of the film F' provided with notches 62. When the parts are in the positions illustrated in Fig. 5 a picture area is positioned in the film gate frame 51 and may be projected upon a screen by means of an objective comprising a pair of lens elements 63. Condensor lenses 64 are provided in front of a projection lamp 65 behind which is arranged a reflector 66.

In order to release the pin 61 from a film notch 62, we provide a cam 67 carried by a slide 68 having a flange 69 connected to the plunger 70 of a cable release. When the operator presses together the plunger end 71 and a finger grip 72 of the cable the slide 68 is moved to the left and the cam 67 lifts the pin 61 out of the film notch 62. Simultaneously, the bellcrank lever 59 is rocked about its pivot to remove tooth 58 from the gear 54. This releases the spring motor which then winds the next area of film into projecting position. When the new film area reaches the film gate 51 the pin 61 will drop into the next notch 62 and the tooth 58 will re-engage with the gear 54 to stop further operation of the spring motor.

It will be appreciated that in both embodiments of the invention hereinbefore described the unwinding of the film from a spool to which it is attached automatically results in sufficient tension being imparted to a spring motor to rewind the film back to the original spool, thus reducing the number of operations usually necessary in feeding a film through photographic apparatus.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A photographic film apparatus in which a member for operatively engaging a film supply spool is rotatable by a manual winding member or key connected to a spring motor which is tensioned during winding of the key to withdraw the film from the supply spool into a film receiving chamber in which without the use of a take-up spool the film is constrained to coil up upon itself, the spring motor being permitted after each exposure of a film area to rotate the supply spool in a direction to rewind the film thereon.

2. Photographic apparatus according to

claim 1, wherein the winding key rotates the spool-engaging member through a gear train, one element of which is engaged by a latch member to prevent operation of the spring motor during tensioning thereof by said winding key.

3. Photographic apparatus according to claim 2, wherein the latch member comprises a pawl or the like which is released automatically from said gear element when a pivoted member connected with the pawl is disengaged from one of a series of notches in an edge of the film.

4. Photographic apparatus according to claims 2 and 3, wherein manually operable means is provided for releasing the pivoted member and latch member to permit the spring motor to wind the film back from the take-up chamber to the film supply spool.

5. A photographic camera according to claims 3 and 4, wherein the pivoted member engaging a notch in the film is released upon depression of the shutter trigger but after an exposure has been made.

6. A camera according to claim 5, wherein a spring-controlled member is carried by a part of the shutter and during movement of said shutter part after an exposure releases the pivoted member from engagement with a notch in the film.

7. A camera according to claims 5 and

6, wherein after the spring motor has moved an exposure area of the film into the exposure frame of the camera, the pivoted member moves into engagement with an adjacent notch in the film and simultaneously causes the latch member to re-engage with the spring motor gear.

8. A film projector according to claims 2-4, wherein the member for engaging the film notches is provided at one end of a pivoted bellcrank lever, the other end of which is provided with a lug or the like for engaging an element of the gear train.

9. A projector according to claim 8 wherein the bellcrank lever is operated to release the spring motor by a manually operable slide member.

10. A roll film photographic camera having film winding and rewinding mechanism constructed and adapted to operate substantially as herebefore described with reference to Figs. 1 to 4 of the accompanying drawings.

11. A film projector having film winding and rewinding mechanism constructed and adapted to operate substantially as hereinbefore described with reference to Fig. 5 of the accompanying drawings.

Dated this 31st day of December, 1942.

RAYMOND E. CROWTHER,
Acting for the Applicants.

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